Rural-Urban Migration and the Intergenerational Transmission of Wealth

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SHAPE Summit, April 19, 2008, Purdue University
Format

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Motivation

• Poor people and poor places tend to remain poor

• Does rural-urban migration worsen or improve poverty and inequality within the rural region?

• Increasing returns lead to multiple welfare equilibria
  • Regional Science literature: Urbanization economies and knowledge spillovers cause inequality between regions
  • Inequality and Growth literature: Credit constraints and fixed costs of human capital investment cause inequality between households
Overview

• Intergenerational model with credit constraints

• Current spatial distribution of economic activity affects regional and household dynamics

• Centripetal and Centrifugal forces: changes in skilled wages and land prices

  **Centripetal:** An increase in population may increase wages due to agglomeration economies.

  **Centrifugal:** An increase in population may decrease wages due to diminishing returns, and raise housing prices.
Assumptions

• Agents are heterogeneous with respect to the bequest they receive.

• Agents must invest in human capital to work in the skilled sector, and must incur an additional cost to migrate.

• Fixed costs of human capital investment, $h$, and migration, $c$.

• Only skilled workers migrate to the city. Unskilled workers are immobile.

• Unskilled wages are constant over time.
Assumptions

• Credit Constraints: Borrowers interest rate, $i >$ rate of return on wealth, $r$.

• Rural-to-urban migration

• Urban population > rural population

• Two periods in each generation (Galor and Zeira, 1993)
  • 1st period: Occupation and location decisions
  • 2nd period: Allocate wealth between consumption of good and land, and bequest
Time-line

Generation $t$

Initial distribution of transfers in generation $t$

<table>
<thead>
<tr>
<th>First Period</th>
<th>Second Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set of possible household decisions:</td>
<td></td>
</tr>
<tr>
<td>• Work in the unskilled sector now</td>
<td></td>
</tr>
<tr>
<td>• Invest in human capital to work in the rural skilled sector in period 2</td>
<td></td>
</tr>
<tr>
<td>• Invest in human capital and migrate to work in the urban skilled sector in period 2</td>
<td></td>
</tr>
<tr>
<td>• Skilled workers receive wages that are determined from migration</td>
<td></td>
</tr>
<tr>
<td>• Households allocate wealth between consumption and transfers.</td>
<td></td>
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</tbody>
</table>

Distribution of transfers for generation $t+1$ determined
Household Preferences

• Cobb Douglas Utility Function

\[ U_{i,t} = \alpha \log(c_{i,t}) + \beta \log(l_{i,t}) + (1 - \alpha - \beta) \log(b_{i,t+1}) \]

• Bequest \( b_{i,t+1} = (1 - \alpha - \beta)x_{i,t} \)

• Indirect Utility

\[ I_{i,t} = \varepsilon + \log\left(\frac{x_{i,t}}{p_{l,j,t}^{\beta}}\right) \]
Goods Production

Production of homogenous good

**Rural**
\[ Y_{r,t} = (H_{r,t} + \eta H_{u,t})^\delta_r H_{r,t}^\gamma \]
\[ w_{s,r,t} = \delta_r (H_{r,t} + \eta H_{u,t})^{\delta_r-1} H_{r,t}^\gamma + \gamma (H_{r,t} + \eta H_{u,t})^\delta_r H_{r,t}^{\gamma-1} \]

- \( Y_{r,t} \): output in the rural skilled sector
- \( H_{r,t}, H_{u,t} \): human capital in the rural and urban regions respectively
- \( w_{s,r,t} \): rural skilled wage
- \( \eta (0 \leq \eta \leq 1) \): the intensity of inter-regional spillovers

**Urban**
\[ Y_{u,t} = n_{u,t} \sigma (H_{u,t} + \eta H_{r,t})^{\delta_u} H_{u,t}^\gamma \]
\[ w_{s,u,t} = n_{u,t} \sigma [\delta_u (H_{u,t} + \eta H_{r,t})^{\delta_u-1} H_{u,t}^\gamma + \gamma (H_{u,t} + \eta H_{r,t})^{\delta_u} H_{u,t}^{\gamma-1}] \]

- \( Y_{u,t} \): output in the urban skilled sector
- \( w_{s,u,t} \): urban skilled wage
- \( n_{u,t} \): population in the city
- \( \sigma \): agglomeriation parameter
Housing Production

- Quantity of land = Housing supply

\[ p_{j,l,t} L_j = \beta X_{j,t} \]

\[ p_{j,l,t} = \frac{\beta X_{j,t}}{L_j} \]

\[ j = r, u \]

\( X_{j,t} \) is the aggregate wealth in region \( j \) of generation \( t \).
Onset of Migration

\[
\frac{w_{s,r,t}}{p^\beta_{l,r,t}} + \frac{c(1+r)}{p^\beta_{l,r,t}} > \frac{w_{s,u,t}}{p^\beta_{l,u,t}}
\]

\[
\frac{w_{s,r,t}}{p^\beta_{l,r,t}} + \frac{c(1+i)}{p^\beta_{l,u,t}} < \frac{w_{s,u,t}}{p^\beta_{l,u,t}}
\]
### Household Decisions

#### Stay in the Rural Region

- **Unskilled Labor**
  \[ x_{i,t} = (w_{n,t} + b_{i,t})(1 + r) + w_{n,r} \]

- **Borrow to invest in human capital**
  \[ x_{i,t} = (b_{i,t} - h)(1 + i) + w_{s,t} \]

- **Invest in human capital without having to borrow**
  \[ x_{i,t} = (b_{i,t} - h)(1 + r) + w_{s,t} \]

#### Migrate to the City

- **Borrow to invest in human capital and migrate to city**
  \[ x_{i,t} = (b_{i,t} - (h + c))(1 + i) + w_{s,a,t} \]

- **Invest in human capital and migrate to city without having to borrow**
  \[ x_{i,t} = (b_{i,t} - (h + c))(1 + r) + w_{s,a,t} \]

- **Invest in human capital without having to borrow**
  \[ x_{i,t} = (b_{i,t} - h)(1 + r) + w_{s,r,t} \]

#### bmin, f, h, s, h+c, z, bmax, \( b_{i,t} \)
Dynamics of Transfers

\[ b_{i,t+1} = (1 - \alpha - \beta) x_{i,t} \]

\[
s = h + \frac{1}{(1+i)p_{i,r,t}^\beta - (1+r)p_{i,u,t}^\beta} \left[ (w_{s,r,t} p_{i,r,t}^\beta + (c(1+i) - w_{s,u,t}) p_{i,u,t}^\beta \right]
\]

\[
m = \frac{1}{1 - (1 - \alpha - \beta)(1+r)} w_{n,r}(2 + r)
\]

\[
g = \frac{1}{(1 - \alpha - \beta)(1+i)-1} (h(1+i) - w_{s,r,t})
\]

\[
l = \frac{1}{1 - (1 - \alpha - \beta)(1+r)} (w_{s,r,t} - h(1+r))
\]

\[
k = \frac{1}{1 - (1 - \alpha - \beta)(1+r)} (w_{s,u,t} - h(1+r))
\]

Poverty Trap
Unstable Steady State
Migration
Households in the long run

- Unstable steady state, g, determines who escapes the poverty trap.

- The position of the critical thresholds and steady states change as households migrate
  - Increasing returns vs. diminishing returns
  - Price of housing in the two regions
Regions in the long-run

• When does a brain drain occur?

Real urban wages, $\frac{w_{s,u,t}}{p_{l,u,t}^\beta}$ rise enough relative to real rural wages so that:

$$\frac{w_{s,r,t}}{p_{l,r,t}^\beta} + \frac{c(1+i)}{p_{l,r,t}^\beta} < \frac{w_{s,u,t}}{p_{l,u,t}^\beta}$$

• When is a brain drain averted?

Real rural wages, $\frac{w_{s,r,t}}{p_{l,r,t}^\beta}$ rise enough relative to real urban wages so that:

$$\frac{w_{s,r,t}}{p_{l,r,t}^\beta} + \frac{c(1+r)}{p_{l,r,t}^\beta} > \frac{w_{s,u,t}}{p_{l,u,t}^\beta}$$
Implications

• Calibration: Urban land area one-tenth of rural

• Housing supply is inelastic: VERY high prices in city

• Incorporate CES housing sector with physical capital and land as inputs

\[ Y_h = A(\theta K_h^\phi + (1-\theta)L_h^\phi)^{1/\phi} \]
Modifications

- Physical Capital needs an accumulation function
- Galor, Moav, 2004
  - Bequest divided between education and savings
  - No fixed costs of education, but human capital is a convex function of education
  - Total savings in both regions equals stock of physical capital
  - Return, \( r \), on savings not fixed anymore: will be determined endogenously
Conclusion

• Interaction between two regions determines:
  • Unstable steady state: who escapes poverty?
  • Steady States: where the households settle

• Conditions necessary for brain drain

• Further research
  • Numerical methods to examine welfare outcome under different initial conditions
  • Place based or person based policies?